



A.D. 1871, 26th OCTOBER. N° 2879.

SPECIFICATION

OF

ALEXANDER MELVILLE CLARK.

TREATING SEWAGE FOR MANUFACTURING
MANURE.

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A.D. 1871, 26th OCTOBER. N° 2879.

Treating Sewage for Manufacturing Manure.

LETTERS PATENT to Alexander Melville Clark, of 53, Chancery Lane, in the County of Middlesex, Patent Agent, for the Invention of “AN IMPROVED PROCESS FOR THE TREATMENT OF NIGHT SOIL AND TOWN OR DOMESTIC REFUSE MATTERS FOR THE MANUFACTURE OF TAFFO GUANO.”—A communication from abroad by Victor Plasse, of the Compagnie Chauffournière de l'Ouest, Paris, France.

Sealed the 19th January 1872, and dated the 26th October 1871.

COMPLETE SPECIFICATION filed by the said Alexander Melville Clark at the Office of the Commissioners of Patents, with his Petition and Declaration, on the 26th October 1871, pursuant to the 9th Section of the Patent Law Amendment Act, 1852.

5 **TO ALL TO WHOM THESE PRESENTS SHALL COME, I, ALEXANDER MELVILLE CLARK, of 53, Chancery Lane, in the County of Middlesex, Patent Agent, send greeting.**

WHEREAS I am in possession of an Invention for “AN IMPROVED PROCESS FOR THE TREATMENT OF NIGHT SOIL AND TOWN OR DOMESTIC REFUSE
10 MATTERS FOR THE MANUFACTURE OF TAFFO GUANO,” and have petitioned

Clark's Improved Process of Treating Sewage for Manure.

Her Majesty to grant unto me, my executors, administrators, and assigns, Her Royal Letters Patent for the same, and have made solemn Declaration that it has been communicated to me from abroad by Victor Plasse, of the Compagnie Chauffournière de l'Ouest, Paris, France.

5

NOW KNOW YE, that I, the said Alexander Melville Clark, do hereby declare that the following Complete Specification, under my hand and seal, fully describes and ascertains the nature of the said Invention, and in what manner the same is to be performed, in and by the following statement (that is to say):—

10

PRINCIPLES.

The admirable laws of nature have provided for all the wants of human beings and the animal and vegetable creation, and furnished the means of sustaining their existence throughout life. On the principle of the circulus future generations are united with those of the past, and 15 if the principle of complete restitution to the soil is adhered to the prosperity of nations and peoples who apply it becomes assured and progressive. It is, however, otherwise when man through idleness or neglect fails to derive advantage from natural manures, and unhealthi-ness is the result followed by the scourge of sickness which destroys 20 the vital principle.

Health and fertility are thus synonymous, hence it will be seen how important it is for large towns to take the best measures for insuring the proper collection and complete utilization of all refuse whatever. This problem notwithstanding has hitherto never been solved in an 25 entirely satisfactory manner. The excreta of man and animals, the refuse of slaughter houses, fish markets, sweepings of streets, houses, and manufactories, are allowed to ferment in the open air, are washed by the rain, and so spread over our streets, or are carried away in the sewers, and the rivers thus become polluted, and, even when imperfectly 30 utilized, these matters possess but one hundredth part of their original volume and richness. Their collection and preparation is mostly left to private enterprise. The processes in vogue are also imperfect, costly, and slow, necessitating an excessive use of chemical agents which are rather prejudicial than useful in agriculture, and the matters possess 35 hardly any fertilizing properties of themselves, their only effect being to render of value, or more properly assimilate certain fertilizing prin-

Clark's Improved Process of Treating Sewage for Manure.

ciples of manufactured manure, too often at the risk of annihilating or destroying the productive power of other useful elements.

Such methods of manufacture can only produce manures of inferior quality, the commercial price of which, however, often exceeds their
5 agricultural value.

Even stable manure, which has a universally recognized value, only restores to the soil but a small proportion of the fertilizing elements which have been extracted from it, and the same may be said of human excreta when used alone as manure.

10 Looking at the question in an agricultural light, towns are so many human stables, producing manure both richer and in more abundant quantity than that of farms, and it is this wealth which it is proposed by the present Invention to collect, concentrate, and treat both chemically and by mechanical means in order to secure all its utilizable properties
15 in the form of solid products which are rendered inodorous and capable of being preserved until required for use without depreciating the quality, at same time providing a composition of sufficient richness to repay the cost of transport.

The vegetable kingdom consists of infinitely varied combinations of
20 five or six elements. All plants, flowers, and fruits are formed of carbon, hydrogen, and oxygen, with a little potash, sulphur, lime, or silica, and especially azote, which latter is contained to such a large amount in human excreta, and more particularly in urine, but in so fermentable a form that on contact with the air the azote becomes
25 rapidly transformed into carbonate of ammonia, having a very disagreeable odour.

All the above elements exist in the refuse of towns and in conditions especially favorable for obtaining combinations suitable for treatment.

30 APPLICATION OF THE ABOVE PRINCIPLES.

The essential object is to collect all refuse matters as completely and thoroughly as possible, and to utilize them without delay in order to prevent or suspend their fermentation by purifying, decanting, and precipitating the same.

35 Hitherto the various materials employed as manures, such as fecal matters, sewage, blood, and other refuse have been always treated separately and distinctly in various ways and never in combination.

Clark's Improved Process of Treating Sewage for Manure.

This Invention consists in utilizing certain residues as agents in the preparation of manures, that is to say, I use dry vegetable and earthy matters for the absorption of liquid or viscous matters, and obtain by the combination of the whole after filtering, drying, pounding, and mixing a plastic mass, which is moulded into cakes, dried in the open 5 air or artificially, and then pulverized for use as manure.

This Invention consists, first, in causing the several elements constituting the refuse of towns to react on one another, and it relates more especially to the employment of drying matters which themselves form manures, in order to retain (and to convert by new combinations into 10 solid inodorous products) the utilizable principles of urine, sewage water, and other fertilizing liquids.

Secondly. In a method of treating the said alvine sewage and other liquid matters to be used in the manufacture of artificial manure (and which are now treated by various disinfecting, decanting, and preci- 15 pitating processes) by the active agency of electricity, that is to say, by passing a current of electric fluid through the liquids to be purified, which facilitates the chemical reaction, precipitation, and settling of the matters held in suspension, as also the clarification and purification of the polluted liquid. 20

Thirdly. It relates to a method of consuming in certain cases these deleterious gases, which are incapable of being combined or sufficiently purified by the disinfecting processes employed by the aid of petroleum in ignition floated on the surface of the liquid. The means employed 25 in this manufacture vary according as they apply to fermentable or non-fermentable or solid matters.

In the first case the preliminary employment of disinfectants previous to further treatment is indispensable, and in the latter case suitable precipitants and absorbents are used.

It will be found more economical and wholesome and of greater 30 advantage in an agricultural point of view to collect the fertilizing matters in as fresh a condition as possible and in small quantities before their decomposition either in the open air or in water impoverishes their quality, besides increasing the cost of treatment.

The refuse of slaughter houses, fish markets, and dwellings are col- 35 lected in metal cases and sprinkled with slacked lime or phenicated sawdust if necessary. Human evacuations are also collected in a fresh

Clark's Improved Process of Treating Sewage for Manure.

condition in suitable receptacles, pipes and moveable pits on the separating system, which permits of the solid matters being obtained free from urine or water. The conveyance of the matters to the several points where they are to be submitted to treatment is to be effected as promptly as possible. Sewage water, urine, blood, and other fertilizing liquids are first deodorized and purified by decanting, filtering, and successive precipitations. The fluid deposit is then combined with earthy residues of road sweepings and dried refuse of various kinds serving as absorbent materials. The liquids are preserved in reservoirs containing a layer of slacked lime at bottom, and covered with a layer of vegetable, animal, or mineral charcoal, which serves to absorb the deterious gases evolved, and if this proves insufficient, they may be dispersed so as to become innocuous by the combustion of petroleum as before mentioned. The chemical precipitation is also aided by an electric current. Fecal matters are first disinfected, thickened, and if necessary enriched by the addition of phosphates of lime or magnesia and superphosphates, and then mixed with slaughter house refuse, bone powder, whether calcined or otherwise, soot, ashes, and other residues, and after trituration and mixing are baked in globular form or moulded in brick machines.

Sweepings are to be sifted and the finer particles utilized as absorbents, while that which remains is sorted, and bones or other useful substances are ground up and added to the matters of which the manure is to be composed, or in the reactions during its preparation. Combustible substances are burnt and the ashes combined with the mass as charcoal or animal black. The solid liquid and earthy matters comprising these several preparations are utilized to form a compost, which is watered with the liquid preserved as before mentioned in order to convert it into a rich manure.

Drying or even freezing processes may in some cases be employed to separate the water from the matters in which it is contained, the means and also the agents employed will vary according to the composition and the degree of fermentation of the matters under treatment.

The disinfectants employed may consist of lime, magnesia, charcoal, tar, clay, and their derivatives, chlorides, sulphates, and phosphates, superphosphates, sulphates of iron and zinc, perchloride of iron, permanganates and other chemical salts, phenic and carbolic acids, bone powder, tan or ashes.

Clark's Improved Process of Treating Sewage for Manure.

The precipitants employed may consist of lime, phosphates of magnesia, and lime, sulphate of alumina, chloride of lime, perchloride of iron, silicate of soda, and other salts usually employed for the purpose either separately or in combination.

The absorbents employed may consist of mould, tan, dried mud, rotten straw, dry horsedung, house refuse, seaweed, ashes, soot, sawdust, dried peat, plaster, marl, quicklime, charcoal, hair, leather and bone shavings, waste of chocolate manufactories, cacao pulp, waste of stearine works and fat boilers, rice, seeds, manure in powder, blood, and other matters. These several agents, which are commonly used for the above purposes, may be employed either alone or combined in various proportions, but care should be taken to avoid the use of heat for vaporizing the liquids or drying the fluids, as the slightest increase in temperature is sufficient to volatilize the ammonia. The thickening, pounding, and mixing of a plastic composite material serves to retain its fertilizing properties, and being compressed by suitable machinery in the form of bricks it becomes perfectly inodorous, and may be preserved for any length of time, especially by putting a crust on the bricks by baking the same. 5 10 15

The taffo may be combined, if desired, in suitable proportions with chemical manures and other substances used for enriching the soil. 20

In witness whereof, I, the said Alexander Melville Clark, have hereunto set my hand and seal, this Twenty-sixth day of October, in the year of our Lord One thousand eight hundred and seventy-one.

A. M. CLARK. (L.S.) 25

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